can be improved by any method whatever, unless the alterations in the density and the curvature are perfectly simultaneous." This is an entire misconception. If a lens has too short or too long a focus, it may be amended *either* by an alteration of curvature, or an alteration of density; if the curvature be irregular, and the rays do not converge to a point, then any increased regularity of curvature will be an improvement. So the contraction of the iris and the muscular movements of the eye are neither of them essential to vision, but only improvements which might have been added and perfected at any stage of the construction of the instrument. Thus it does not seem at all impossible for spontaneous variations to have produced all the delicate adjustments of the eye, once given the rudiments of it, in nerves exquisitely sensitive to light and colour; but it does seem certain that it could only be effected with extreme slowness; and the fact that in all three of the primary groups, Mollusca, Annulosa, and Vertebrata, species with well-developed eyes occur so early as in the Silurian period, is certainly a difficulty in view of the strict limits physicists now place to the age of the solar system. A. R. WALLACE

THE PLANTS OF MIDDLESEX

Flora of Middlesex: a Topographical and Historical Account of the Plants found in the County; with Sketches of its Physical Geography and Climate, and of the Progress of Middlesex Botany during the last Three Centuries. By Henry Trimen, M.B., F.L.S., and W. T. Thiselton Dyer, B.A. Pp. xli., 428. (London: Hardwicke, 1869.)

THE first local Flora published in England gives a list of the plants of Hampstead Heath. It was prepared by Thomas Johnson, Apothecary on Snow Hill. Early on the morning of the 1st August, 1629, and accompanied by a few friends, he left London and proceeded on a simpling expedition to Hampstead, by way of Kentish Town and Highgate. A heavy shower arrested their progress for a little, but nothing daunted they made their way into the woods, and then on to the heath. The day's excursion was brought to a close in a country inn at Kentish Town, where the party dined together.

Johnson enumerated seventy-two plants as the result of the day's simpling. In subsequent expeditions he added sixty-nine others, so that in 1632 his *Enumeratio Plantarum in Ericeto Hampsted. cresc.* contained 141 species. This rare little volume, with its forgotten names—those of Gerarde and Lobel—is the earliest precursor of the Flora of Middlesex. Since its publication, the materials have been gradually accumulating for illustrating the Flora of the Metropolitan district, and one of the most valuable features in the work before us is, that its authors have, with great care and singular success, investigated and expounded all the ancient as well as the more recent plant-lore bearing on the subject.

The bi-nominal system of nomenclature and the Linnean classification introduced, somewhat more than a century ago, a new era into the science of Botany, and relegated to comparative obscurity the older authors. The difficulty of determining the value of their names, and the practice of neglecting all ante-Linnean synonymy, have caused their labours to be set aside. The authors of this volume have made the works of these earlier writers critically certain by the help of the Herbaria of Merrett, Petiver, Plukenet, Ray, and specially of Buddle, and of the manuscripts relating to them now preserved in the British Museum.

We have here given for the first time an authentic biography, so to speak, of the different plants so far as they are connected with Middlesex. The name of the observer who first recorded each plant, the date of the record, and the place where it was observed, are specified; while the chronologically-arranged localities where it has been at different times gathered, enable one frequently to trace its increasing rarity, and in not a few cases the biography terminates with the record of its complete extirpation. Thus Turner, the father of British Botany, first (1562) records Penny-royal (*Mentha Pulegium*, Linn.) from "beside Hundsley upon the Heth beside a watery place;" after him Gerarde (1597) tells us that it grew "on the common neere London called Miles ende, whence poore women bring plentie to sell in London Markets;" and then, through Blackstone, to our own time when it was found in plenty beside the Hampstead ponds, but finally disappeared from the county about twenty years ago. London Rocket, which Morison says might have been reaped like a crop of wheat on the ruins near St. Paul's after the Great Fire, was, up to the beginning of the present century, a common plant in Middlesex, but is now completely lost. The history of *Cucubalus*, from the Isle of Dogs, is much shorter. Known in England only in this locality, it flourished apparently in a wild state for twenty years, until building operations destroyed the habitat about twelve years ago.

Every page of the volume supplies similar interesting details in the history of Middlesex plants. This feature of the work is as novel as it is important. There is abundant evidence that the authors, in addition to their faithful and even loving exposition of the labours of their predecessors, possess a sound critical acquaintance with the species of British plants. Even in this aspect, the volume is not behind the best of our county Floras.

The influence of the geological condition of a district upon the organised bodies connected with it has lately been receiving the attention it deserves. Important conclusions have resulted from the Government inquiry into the relations subsisting between the diseases of man and the geological structure of the south-eastern corner of England. The connection between the indigenous vegetation and the geology of its habitat is not less interesting, and, when data have been sufficiently accumulated to warrant safe deductions, will yield valuable information. M. Thurmann, in an elaborate essay on the botany of the Jura, has shown that vegetation is influenced by the manner in which the particles of the rocks are combined, rather than by the nature of the materials of which they are composed. He has consequently classified rocks into two great groups, based on their mechanical constitution: the one he calls "Eugéogènes" (plentiful-detritus-yielding) and the other "Dysgéogènes" (sparing-detritus-yielding). The essential differences between the two groups are in respect to their hardness, their power of absorbing and retaining moisture in small masses, their permeability in extensive deposits, and the rate at which they form detritus resulting from the possession of these characteristics. Mr. Baker has applied the conclusions of the French

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botanist to Britain, in his Flora of North Yorkshire, and, more recently, in that of Northumberland and Durham. The limited extent of Middlesex, and the uniform character of its geology, give little scope for the application of these views to its Flora. The only Dysgeogenous rocks are the narrow outcrop of chalk in the north and north-west; the remainder of the county being composed of typical Eugeogenous strata. As far as it is possible, however, the authors have made good use of M. Thurmann's labours, and the limited application is to some extent compensated for by the accuracy of the details.

Appended to the volume is a valuable contribution to the history of British botany, covering to some extent the ground taken up by Pulteney in his "Sketches," and continuing it to the present day as far as the matter relates to Middlesex. Large additions are made to Pulteney's biographies of Turner, Johnson, Plukenet, Petiver, and Doody. New and interesting memoirs are given of Buddle, Blackstone, Curtis, and other less known investigators of Middlesex plants. It would be greatly to the advantage of science, if the authors, encouraged by the success which has attended their investigations into the progress of Middlesex botany, would continue their researches, and give us, not a new edition of Pulteney, but a new History of Botany in Britain.

W. CARRUTHERS

OUR BOOK SHELF

Van Heurck on the Microscope.—*Le Microscope, sa Construction, son Maniement, et son Application aux Études d'Anatomie végétale.* Henri van Heurck. 8vo. pp. 223, with Illustrations, price 3*s.* (Antwerp, 1869. London: Williams and Norgate.)

THE title-page of this little work, a mere fragment of which we have transcribed above, is perhaps its most objectionable feature. The ambitious superscription, however, need not affect its usefulness as an elementary descriptive treatise, and the English reader may add to his information by the perusal of a manual of microscopical manipulation written from a French or Belgian standpoint.

We have no manual in English of precisely similar scope and intention with which to compare M. van Heurck's; the one which it most resembles is, perhaps, Mr. Currey's translation of Dr. Schacht's excellent guide to the use of "the Microscope in Vegetable Physiology," the chief difference being in point of thoroughness: the former is a popular, the latter a scientific work.

M. van Heurck's book is divided into two portions, of about one hundred pages each: the first, on the construction and choice of a microscope; the second, on its application to vegetable anatomy. We may describe each section in a few words.

Naturally, the instruments of French makers have prominence assigned to them; and most of the well-known models manufactured by Hartnack, Chevalier, and Nachet are figured, together with one or two modifications we do not recollect having seen before. In too many of these, cheapness and simplicity go hand in hand with toy-like inefficiency. Some are of more interest, such as Chevalier's "Universal Microscope," and a "vertical," or rather "inverted," arrangement constructed by M. Nachet for photographic purposes. In the section devoted to manipulation, the subject of micro-photography is treated at greater length than has been customary in such works.

All notice of the microscopes of English makers appears to have been omitted in the first Edition of "Le Microscope," beyond a general intimation that their "price is exorbitant, and their complication excessive;" but, "at the request of subscribers," an appendix has been prepared to the present issue, containing a description of the instruments of Ross, R. and J. Beck, and Powell and Lealand. This seems to be written with only partial knowledge, and with very unequal justice.

The second portion of the book contains little of novelty in either fact, theory, or method. Beginners will find in it the sort of information they require to enable them to examine and mount vegetable tissues, and the numerous little woodcuts will enable them to understand the more important structures. There is also a section on the application of reagents, intended for those who have advanced a step farther in histological pursuits.

We may repeat that, though M. van Heurck's work will not bear comparison with several of our English manuals in completeness, the reader will scarcely rise from it without having gained a few useful hints.

H. B. BRADY

Bryologia Silesiaca. Von Dr. Julius Milde, Professor in Breslau. (Leipzig, 1869.)

THIS is a systematic description of the mosses, not only of Silesia, but also of Jutland, Holland, the Palatinate, Baden, Franconia, Bohemia, Moravia, and the neighbourhood of Munich. Special attention is, however, devoted to the Silesian flora. The work is prefaced by an account (for the use of beginners) of the most important organs of the musci in reference to the determination of species.

New Batrachians.—*Ueber neue und wenig bekannte Batrachier aus Australien und America.* Von W. Keferstein, Prof. in Göttingen. (Berlin, 1868.)

THE Göttingen Museum is rich in Australian frogs. Prof. Keferstein here describes, from the museum specimens, twenty-nine species. He also enumerates nineteen others, recorded as such in the literature of batrachiology, although their specific value appears, in many cases, to be doubtful. The frog-fauna of Australia, according to Prof. Keferstein, bears a great resemblance to that of South America. Some batrachians from Costa Rica are likewise described in this brochure. Five plates of figures are appended. It may be worth mentioning that the authorities of the museum will be glad to exchange some of their superfluous Australian species for other batrachians.

The Sandwich Islands.—*Ein Jahr auf den Sandwich-Inseln (Hawaiische-Inseln).* Von Dr. J. Bechtinger. (Wien, 1869.)

THE chief interest of this volume lies in its pictures of the social and moral condition of a primitive people in close contact with modern civilisation, and the subject for many years of unexampled missionary efforts. The author enters somewhat fully into the character of the climate, the nature of prevalent diseases, the physical and psychical characters of the people, and their probable ethnic affinities. Leprosy is a disease unfortunately very prevalent among the inhabitants, and their Government have hit upon a notable plan for putting the sufferers out of sight, and preventing the spread of the disease by contagion. In the island of Molokai there is a plain near the sea, and walled off from the rest of the island by mountains from two to four thousand feet high, and almost totally inaccessible. To this spot lepers are conveyed by a vessel which periodically leaves Honolulu for that purpose, and for the purpose of carrying food. Every other communication with the sufferers is strictly prohibited. Dr. Bechtinger had a very natural desire to visit this forbidden valley, and ascertain the condition of its inhabitants. Knowing, however, that great opposition would be made to his doing so, he resolved to go thither privately, and attempt to reach the valley over the mountain range at its back. Attended by a photographer, he succeeded in his project, and found the poor wretches (hundreds and hundreds of them) in a most horrible state, utterly neglected and almost entirely without the

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